

Physically Handicapped Workers:

- I. Experience in War Industries
- II. Rehabilitation of Veterans

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PHYSICALLY HANDICAPPED WORKERS

BY ROSS A. McFARLAND

THE employment and rehabilitation of persons with physical and mental handicaps by industry, although not a new problem, takes on increasing importance at the present time because of the returning veterans. Sentiment and loyalty may enable a handicapped veteran to find a position, but unless his services can stand up in a competitive market when the patriotic fervor of war has passed, the problem will be only glossed over and not effectively solved. The employer particularly should analyze this problem on a sound, businesslike basis.

In this paper an attempt will be made (1) to review results obtained in various concerns which have used workers with physical handicaps, especially some of the most effective procedures for using such workers and some of the dangers which have been encountered; and (2) to outline some of the questions about re-employment of the returning veteran and some of the most important characteristics of the veteran, based upon first-hand observations in various combat zones.

Definition and Scope of the Problem

A physically handicapped person may be considered as one who cannot perform all types of work because of certain defects or disabilities due to disease, injury, or circumstances of birth. Many concerns have always hired persons with minor handicaps such as hernia, asthma, and 20/30 vision. Because of the shortage of manpower in industry and because of the casualties in the war our use of the word *handicapped* is being extended to apply to those who are actually blind in one eye, who are mental cases, who have amputations or crippling defects, or who have certain diseases. In this study major attention will be given to advanced physical defects which, although limiting physically, need not limit vocationally.

It is important to consider physical defects as being, from a functional point of view, either static or dynamic: (1) The loss of a finger, short stature, missing teeth, hernia, some visual defects, leg shortening or amputation, the paralysis of a single muscle group, deep

scars of bone or soft parts of the body are static defects, some of which can be corrected and which rarely affect the individual's capacity to work. The leg amputee, for example, can work, either seated or standing, at a task which does not require mobility; paralysis of an arm may still permit the individual to work as a draftsman or as a salesman.

(2) Tuberculosis, syphilis, and similar systemic and progressive diseases are dynamic defects: they affect the entire body and by their influence on perceptual, intellectual, and motor functions reduce productivity. Persons with active diseases of this type should be considered questionable as employees, whereas those with static defects, unless job analysis in a specific vocation indicates an unusual physical requirement, may be considered employable.

One source of information relating to the number of physically handicapped persons in our population is the National Health Survey.¹ In the winter of 1935-1936 a survey was made of 2,500,000 persons in urban populations, and estimates were worked out for the entire population. The largest proportion of physically handicapped individuals fell in the following classifications: the deaf, the blind, and those having orthopedic impairments. Estimates for 1940 were, for males, 356,000 with major impairments (total deafness and blindness and incapacitating impairments) and 2,834,000 with minor impairments (partial deafness, blindness in one eye, and nondisabling impairments); and for persons of both sexes, 623,000 with major impairments and 4,374,000 with minor impairments—a total of 5,000,000 persons, having either major or minor im-

pairments, even with the defects limited to the above three classifications. Those with heart disease, tuberculosis, and other major diseases would add at least 3,500,000 to the above figures. It has been estimated that 10% of all the men in the armed forces will be discharged with some form of disability. Thus, if 1,250,000 veterans are added to the above estimates, the magnitude of the problem becomes clear—over 10,000,000 disabled persons.

Several million of these handicapped persons have been employed during the war with a high degree of success. Yet in 1943 the United States Civil Service Commission estimated that between 2,000,000 and 3,000,000 physically handicapped civilians suitable for employment in industry were still available. Although a large number of physically handicapped workers have been drawn into industrial jobs by the exigencies of war, the problem will remain a serious one for many years to come. The National Safety Council estimates that about 70,000 workers become permanently disabled from industrial accidents each year, many of whom could be rehabilitated for work.

It is well known at the present time that many industries are employing large numbers of both women and older persons. Though women and older persons are not, to be sure, in the same category as those who are physically handicapped, this new type of industrial worker has made it necessary for plants to re-engineer some of their operations and to readjust some of their thinking. Those who were previously considered to be too old have proved to be safe, depend-

¹ Bernard D. Karpinos, *The Physically Handicapped*, Public Health Reports 58: 1573-1592 (October, 1943). Also, George St. J. Perrott, Clark Tibbits, and Rollo H. Britten, *Scope and Method of the Nation-*

Wide Canvass of Sickness in Relation to Its Social and Economic Setting, Public Health Reports 54: 1663-1687 (September, 1939).

able, and efficient workers if properly placed.² Experience gained in the use of women workers has made employers

conscious of a method of approach similar to that used in the employment of physically handicapped workers.

I. EXPERIENCE IN WAR INDUSTRIES

Any employer is justified in asking the question whether physically handicapped workers are less efficient and, in particular, whether they are an accident hazard in the factory. Experience has demonstrated that, if proper placement and supervision are carried out, their record is very satisfactory.

Numerous studies have shown that the physically handicapped have many advantages over other workers: (1) They are virtually draft-proof. (2) They are highly motivated to succeed, both in quality and quantity of production. They take better care of their work and pay more attention to it, thus increasing productivity. (3) They are sometimes better for particular jobs than normal persons; e.g., blind workers often have unusual abilities in assembly work involving tactual sensitivity. (4) They are grateful for the opportunities that have been given to them, and they are eager to prove their loyalty by making good. A job is something they have looked forward to and for which they have specially trained; it is a chance to be independent. (5) They concentrate on their tasks, and the absentee problem is less acute than with the able-bodied. They do not shop around for better jobs; this reduces turnover and makes for the better morale of a contented work force. (6) In general, the handicapped worker is not only a heretofore neglected source of manpower, but also a steadying influence on normal fellow employees.

A recent study³ has been made, in a

large manufacturing plant, of 685 handicapped employees in comparison with the same number of normal individuals. The results indicated that (1) there were 7.9% more resignations of the normal workers than of the handicapped workers, (2) 7% more absences occurred among the normal workers, (3) 5.6% more discharges took place for just causes among the normal workers, and (4) 4.6% more increases in earnings were received by handicapped workers than by normal workers.

The United States Office of Education asked more than 100 employers, most of them executives of large corporations engaged in manufacturing war materials, to submit reports showing how their physically handicapped workers compared with their able-bodied workers in these respects: absenteeism, labor turnover, accident rate, and productivity. The results are reported in EXHIBIT I.

EXHIBIT I. RESULTS OF A SURVEY FROM INDUSTRY
ON THE ABILITIES OF HANDICAPPED WORKERS
VERSUS ABLE-BODIED WORKERS

	Number of Em- ployers Reporting	Less for Handi- capped	Same for Both Groups	More for Handi- capped
Absenteeism	97	53	39	5
Labor Turnover	76	63	12	1
Accident Rate	87	49	36	2
Productivity	105	11	69	25

Accident Frequencies. The assumption that the use of physically handicapped workers will bring increased accident

² Cf. the author's article, "The Older Worker in Industry," *HARVARD BUSINESS REVIEW*, Vol. XXI, No. 4 (Summer, 1943), p. 505.

³ D. L. Lynch, "Employment of the Physically Handicapped," *Journal of American Medical Association*, Vol. 116, No. 13 (May 29, 1941), p. 1380.

frequencies is fallacious. If a disability is due to prior accidents, the worker has probably learned the lesson of safety the hard way. Indeed, the safety record of physically handicapped workers is particularly striking when one considers the question of serious second injuries. In Massachusetts, for example, where an injured worker who has already lost an eye, arm, or leg may, if he loses the second eye, arm, or leg, receive a disability award (one half of which is paid by the employer or insurance carrier and the other half by a special fund of the state), only three such awards were made for the year ending June, 1938, out of a total of 34,000 tabulated injuries for that year. If second injury fund legislation, now found in 19 states, were made nation-wide—as it should be—the compensation costs of isolated second injuries for the disabled would be spread over the entire industry.

In general, the physically handicapped are likely to have fewer accidents because they are accustomed to act more cautiously. The statistical evidence available confirms this belief. Two specific studies may be mentioned here. Western Electric Company, Incorporated, studied 685 handicapped workers in a two-year period, finding that 23.5% of them were injured at work, as contrasted with 39.1% of the control group of nonhandicapped persons. The Pennsylvania State Bureau of Rehabilitation analyzed extensive automobile accident data and found that 0.6% of 29,000 physically handicapped auto drivers were involved in accidents against 4.5% of 2,000,000 drivers of normal physical fitness.

Examples from Industry. The following quotations are from different employers using large numbers of handicapped workers: "We find that we have not experienced any accidents among dis-

abled employees, other than very minor injuries." "The physically handicapped are undoubtedly more loyal to their work and employer, and absenteeism is negligible." "Handicapped employees are . . . much more conscientious about their work. This . . . tends to increase the quality of the work output." "We find that from a production standpoint the quality and quantity produced by these people are better than those of normal people." ". . . the handicapped has proved his worth through efficient production, good conduct, perseverance, loyalty and regular attendance. Employment of the physically handicapped has proved so valuable that special campaigns have been held to recruit them."

The experience of a construction company in Indiana, provides a specific illustration of what can be done with physically handicapped workers. This company obtained a contract early in the war to erect an ordnance plant. It was the fourth concern to receive a large contract of that nature in the same community. Thus, when the company started construction, its predecessors had pretty well combed the community for laborers. A great many of those the company employed had been rejected by other concerns. Through careful placement on appropriate jobs, based upon job analysis studies and pre-placement examinations, many men with defects were practically and safely employed.

The placement examinations revealed that many others could be employed if defects which were remediable could be corrected or controlled. On this one contract, 133 men suffering from hernias were employed. The company made sure that each of these men either had or was supplied with a properly fitting truss and then placed him on appro-

priate work. This assignment was so well carried out that at the conclusion of the job a year later not one of these 133 men had suffered a disability because of his hernia. Other persons were encouraged to secure eyeglasses or hearing aids and were then employed; others to receive correction of bad oral conditions, flat feet, or other infirmities. In cases where a prosthetic device was needed, the prospective employee was advised, and in some cases assisted, to obtain such a device. A medical department was set up when the job started, and other remediable conditions were treated in order to make it possible and safe for numerous employees to work. At the conclusion of this contract neither the accident rate nor the insurance loss had exceeded the normal.

The manufacturing concern which subsequently took over the plant when it was erected was so well pleased with the success that the building company had experienced in the employment of physically handicapped persons that it, too, put in a comprehensive medical department, took over many of the same employees, and continued to provide a remedial-treatment medical service on the premises. This concern had so much success with its program in this plant that it enlarged the medical departments in its many other plants throughout the country to provide both a remedial medical service and an accident service for the purpose of keeping ill or physically defective people at work.

A great deal can be learned from the experience of the Ford Motor Company in the employment of the physically handicapped. During the past 20 years, this company has had a policy of having the same proportion of handicapped workers in Ford plants as in the civilian population. At present, at the River Rouge plant over 11,000 handicapped

civilian workers are employed and over 3,000 returned service men have been hired, making a total of about 10% physically handicapped employed there. The sightless number 687; some have lost both their eyes; some can only distinguish between light and darkness; a few can see motion if it occurs between them and light. Only two lost their vision because of accidents in the Ford plant. There are 66 who are deaf and dumb; 42 who are partially incapacitated because of infantile paralysis; 112 who suffer from epilepsy. Eighty have but one arm; 1 has no arms; 223 have one arm crippled; 12 have had both arms amputated; 91 have had one leg cut off; 36 have one leg badly crippled; 31 have lost use of some parts of their bodies because of spine fractures; 96 have spine curvatures; 101 suffer from organic heart ailments. The wage rates of these workers are comparable to those of normal workers; even the blind, for example, make from 95 cents to \$1.15 an hour. It is distinctly understood that this is neither charity nor altruistic humanitarianism. Each one of these workers is expected to give, and does give, full value for his wages. The company has found that a handicapped worker can be employed just as well, given the right job, as a man with normal eyes, hands, feet, and so forth.

In another large concern, as of January 1, 1943, over 10,000 disabled persons were employed. Those with amputations served as watchmen, attendants, elevator operators, messengers, and salvage workers. The deaf mutes were placed where there were no overhead cranes or dangers from falling stocks or in departments where the danger was slight, since they were incapable of hearing warning bells and signals. The totally blind workers were employed in packing small stock for shipment, assem-

bly work, and inspection, especially where tactual sensitivity played an important role. There were 397 persons with finger amputations who were employed in varying occupations depending on the extent of the disability. Two men with both legs amputated were working at jobs which permitted sitting; they packed stock, repaired electrical equipment, did inspection work and clerical work. There were 157 persons with one leg amputation; with the aid of an artificial limb, some of these men did full-time standing work at machines and production benches; others worked at jobs similar to those pursued by workers with both leg amputations. These illustrations demonstrate that men with marked physical defects can be usefully employed in industry.

The Peoria Plan for Rehabilitation. An outstanding illustration of what can be accomplished along the lines of rehabilitating handicapped workers may be found in the factories of Peoria, Illinois. This is the widely discussed "Peoria Plan."⁴ The employers in this area are organized to place effectively large numbers of physically handicapped persons in industrial jobs through the cooperation of some 49 federal, state, and local agencies in this city. From the beginning an attempt was made to be sure that the jobs were not being created as a matter of charity; it became perfectly clear that handicapped persons were desirable, in fact often preferable, for certain jobs. The idea originated in the Caterpillar Tractor Company, a busy war plant employing 18,000 men and women in the construction of machinery involving heavy and light machine work, assembling, and work in

iron and aluminum foundries; approximately 800 handicapped persons have been successfully located in this one plant.

Through the direction of an executive committee and office staff, the plan is now being extended to take care of the returning veterans. At the present time facilities have been set up for the re-employment of about 5,000 veterans.

There are many other communities that have utilized plans like the Peoria Plan with marked success.

It should be kept in mind that the success of the Peoria Plan has been based not alone on the effective organization which was set up in this community, but also on the fact that in each plant, such as the Caterpillar Tractor Company, a number of very specific things were done. The usual procedure was this:

(1) Because it was first necessary to determine the jobs available for the physically defective individuals, a survey was made; each supervisor listed the jobs in his department which could be performed by employees with certain listed handicaps. (2) With this information at hand, the personnel division with its knowledge of "job analysis" interviewed each applicant and then presented him to the company medical department for its approval of the specific job chosen. (3) A personal interview by the medical department followed, in which the employee was impressed with the necessity for care and safety in his work, and a note was placed upon his record card that no transfer could be made without the consent of the medical department. The various aspects of these procedures will be analyzed in detail later on in this article.

Community Rehabilitation Centers

A number of rehabilitation centers have been established in various com-

⁴ Information relating to this subject may be obtained by writing to "The Peoria Plan," 415 Liberty Street, Peoria 2, Illinois.

munities. An outstanding example of such a center is the one sponsored by the Liberty Mutual Insurance Company in Boston. An attempt has been made there to determine the capacity and the limitations for applying physical medicine to injured workmen requiring extended convalescence. Experience has shown that the usual medical and surgical procedures have not been sufficient in such cases, since loss of muscle tone and traumatic neurosis often delay the patient's recovery, in many cases resulting in his complete inability ever to work again. Therefore, this center in Boston provides physical therapy, occupational therapy, and recreational therapy under medical supervision at the earliest time consistent with good medical judgment.

The following kinds of treatment are given: (1) The physiotherapy department includes devices for controlled exercise, as well as heat treatments and manual massage for stimulating the circulation. The equipment has been selected with the advice and guidance of physicians and trained therapists from the large medical centers where experimental research has been conducted. (2) In the occupational therapy department, treatment is given according to the needs of each case. Convalescence from serious and prolonged injury may involve a program of muscular exercise under strict medical supervision, competitive games, or in certain cases psychological study relating to a change in mental attitude or vocational aptitude. Actual work serves as a strong stimulus for recovery. As patients show improvement, they are assigned to appropriate tasks involving activities similar to those encountered in their normal work. (3) In the recreational department emphasis is put mostly on the recovery of the proper mental attitude through social

rehabilitation. Many times the ability of a patient to excel in a game of pool will do more toward restoration, by convincing him that he can get better, than will the work of physical therapies.

The number of full recoveries in difficult disability cases of long duration has been very gratifying. Without such treatment, many of these would possibly have become public charges; at least, they would not have made any further contribution to industry. An interesting, although possibly not typical, case history can be given of a worker suffering from a ruptured disc. He was unable to work, and in a simple maneuver like walking downstairs he had to go backwards very slowly. Careful medical study revealed that certain stretching exercises, especially those involved in playing pool, were of great help. He was back on the job within a week.

Recently, Henry Ford has opened Camp Legion on a 300-acre tract in Dearborn, Michigan. Here all veterans who have a medical discharge and are disabled are eligible for further rehabilitation. But the camp is especially designed for those who wish to return to industry or to farming. An opportunity is given the veterans to work in the fields or in the machine shops. Classes in supplementary subjects are also available. Each veteran receives \$3 a day, his board and room, and medical attention. The men may remain in Camp Legion until they are mentally, physically, and skillfully ready to go to work. They do not have to work in the Ford plants, although they may apply for work there if they wish to do so.

The results obtained from various rehabilitation centers indicate the absolute necessity of initiating such efforts as soon as possible after the date of injury. This means that rehabilitation should begin in the hospitals; the great-

est field for rehabilitation of this type will be found in such places and will result in a much greater percentage of full recoveries in the shortest possible time and at minimum expense. Also, experience indicates that rehabilitation in its broad sense can never be attained by the use of physiotherapy alone. The supplementary application of recreational and occupational therapies is absolutely necessary to serve all types of cases and bring the maximum recovery in the shortest possible time.

Methods and Procedures

During the past few years, many employers have hired large numbers of physically handicapped persons in an effort to make use of all available manpower for war production. Many young men classified as 4-F have been employed, and thousands of women are doing work that was formerly done by men. The jobs are not all being done in exactly the same way as they were done formerly, but they are being done with equal efficiency and in some cases even with greater efficiency. Originality has played a large part in making this accomplishment possible. By and large, it has been effected through revision in production methods or alterations in the design of machinery. For example, if a woman replaces a man who perhaps did heavy lifting, the job has been redesigned so that the heavy materials which had to be lifted could be just as well handled by sliding, either by overhead carriers or on benches. In many instances, not only were the lifting elements of the job avoided, but the whole job was speeded up as well. In other cases, adding a prosthetic device to a machine rather than to a man has made it possible for a one-legged, one-armed, one-eyed, or otherwise handicapped individual to operate that machine with

the ease and efficiency of an entirely normal person.

This part of the article gives a brief review of some of the methods which have been used to accomplish these results, and outlines some of the procedures which in any factory are fundamental to the adjustment of the physically handicapped worker.

Methods. The methods may be briefly outlined as follows: (1) *Placement according to the physical capacities of the worker.* In many cases, if the worker is properly placed, no alteration of machinery or remedial treatment has been necessary. (2) *Remedial treatment.* This may be illustrated by the case of a worker with hernia, a defect which is subject to remedial treatment. Such an applicant for a job can be required to have an operation or obtain mechanical means of correction. If the man is hired, the plant supervisor, of course, must make sure that the physical demands of the job are not too severe. (3) *Medical control or continual supervision.* Examples of this may be found in workers with heart disease or diabetes. By careful medical supervision and treatment, the applicants may be placed on many jobs with safety. (4) *Alteration of a machine or a factory practice.* Examples of the alteration of machines are the substitution of a pedal for a lever, a shift of the control from left to right, or the use of a mechanical feed instead of a manual feed. Examples of changes in practice are the reduction in the size of a tote box for lifting or carrying; change in shovel size, installation of a mechanical aid to avoid manual lifting or sustained handling of a tool.

Procedures. Experience has indicated that certain definite procedures must be followed if the physically handi-

capped are to be successfully placed. Probably the most important procedures are: (1) a job analysis of the various operations in the plant; (2) a pre-placement medical examination, relating to the physical restrictions of each person; (3) testing for special aptitudes and abilities; (4) placement of the worker on a job based on the information obtained in the course of carrying out the above steps, and (5) a follow-up system in which the worker is "controlled" to make certain that he does not shift to another type of work for which he is not physically fitted.

The same general procedures are also important in the case of physically handicapped veterans. The employer will chiefly be concerned with the actual placement and training of the veterans for specific jobs, since, if the military services develop a well-rounded program of rehabilitation, the veterans will be able to carry out simple manual tasks and to handle themselves in the many routines of daily life.

The Job Analysis. First of all, a job analysis should be made of the various operations in the plant for the purpose of determining the specific physical demands of each particular task. Studies which are quite simple may cover from 65% to 75% of the cases, although many jobs demand a more exhaustive analysis. The duties of the various jobs, both physical and otherwise, should be precisely stated on forms which cover the nature of each task, the percentage of time spent on each in detail, the difficulties and importance of the duties, and the precision with which an employee must operate.

Other facts should be included—for instance, a description of the surroundings, hazards inherent in the work, weight and height requirements, work-

ing hours, promotional sequences, place of the job in the organization, grades of supervision received and exercised, and any other facts which will serve to identify the duties, conditions, and responsibilities; because many of these factors depend on personal opinion, a number of persons should record their specifications for the job. It is particularly important to have a clear statement of minimum requirements. A number of additional factors might include education, special courses for background, knowledge of blueprints, intelligence level, past experience required, amount of training time on each job, and the time to reach minimum efficiency. Thus the placing of any specific handicapped person on a job would include all the normal factors entering into selection, plus special consideration of the individual's physical limitations in relation to job requirements.

It should not be assumed without investigation that certain jobs, or parts of jobs, are not available for physically handicapped persons. Analysis should be based on actual observations of all positions in the plant, with a thought to their suitability for such workers. It is of little value merely to prepare lists of jobs for which the physically handicapped are usually engaged. The physical requirements of similar jobs in different plants may vary widely; also, physical handicaps are rarely exactly similar. These factors emphasize the need for the individual approach.

Pre-Placement Medical Examination. In any industrial business or concern where physically handicapped workers are employed, it is very important that a pre-placement medical examination should be given. The purposes of this examination should not be confused with those of an ordinary pre-employment

examination or even of a general physical examination, important though they be. This examination is specifically a pre-placement examination, having for its chief purpose the determination of the physical restrictions (rather than the abilities) of the person examined. Such an examination should be carried out by a physician.

Although the physician, unless he is especially well acquainted with the plant, need not suggest what specific job the man can handle (a question that can be decided on in the factory after consultation), he should state both the condition of the patient and the kind of physical duties that should be *avoided*. He should do more than simply state, for example, that a worker has a certain type of heart ailment which is well compensated; he should also make clear what that particular worker cannot do physically. He might recommend that the job should not require strenuous physical exertion, especially in high temperatures, or involve excitement or emotional tension. In the case of arrested tuberculosis, he should make certain that no aggravation exists and might recommend that the worker be placed in a well-ventilated room with controlled assignments requiring minimum physical exertion. In the case of a psychoneurotic, rather than state that the worker is characterized by unusual forms of behavior and should be supervised, which would be of little practical help, the pre-placement report might carry the specific advice that this man should not work alone, that he should not be placed in a very noisy, congested area or under stress from jobs requiring undue pressure or speed. These statements are not meant to be final; they merely illustrate the type of specific advice needed.

The use of remedial treatment needs

more emphasis in industry; statistics show an increase in production and a decrease in accidents where a progressive attitude has been taken in suggesting and insisting on remedial action. In the physician's report, therefore, a statement should be required as to whether the case is (1) remedial, i.e., susceptible of improvement if given constant aid in the form of mechanical devices or medical appointments for treatment, or (2) nonremedial, i.e., not requiring aid but a permanent disability. If the physician checks the case as a remedial one, the implication may be that the man requires glasses to do his job, that he has defective teeth or some disturbance which can and should be corrected by way of medicine or surgery. A follow-up system should be used to see that the correction is made. If the physician checks the case as one requiring constant medical assistance, such as a periodic medical examination or prescription medicine, an investigation is needed to find out whether the medicine is being taken or the periodic examination is being conducted. Also, when there is a check on the employee's card that a mechanical aid is required, the supervisor will need to see that the mechanical aid is being used. This system prevents the possible aggravation of the existing impairment or illness.

Tests of Special Aptitude or Abilities. In all plants, large and small, greater use might be made of the tests and methods devised by experimental and vocational psychologists to detect and measure special skills and abilities; this is especially true in dealing with the physically handicapped. First of all, an appraisal should be made of the worker's general intelligence, to determine whether he is of superior, average, or low mental ability. Then use can be made of a series of

aptitude tests to reveal special skills such as unusual finger dexterity, unusually quick and keen visual reactions and eye-hand coordination, or other sensory-motor reactions. Many blind persons, for example, have revealed unusual ability in assembly work and are apt to have delicate tactual sensitivity due to the extensive use of their fingers in reading Braille. In general, modern psychology has revealed that each worker tends to be stronger in one trait than in others, or even that he is more gifted in some one way or another than his fellow workers; aptitude tests are available to reveal these differences. Also, tests relating to interests and personality traits offer promise in finding out about the worker's appraisal of himself concerning past experience and habits, likes and dislikes, and traits of temperament.

Information about intelligence, skills, and personality would naturally be of great value in placing the physically handicapped worker most effectively. If employees enjoy their work and are mentally and physically well adjusted to it, they are less likely to desire changes in their jobs, thereby reducing labor turnover within plants as well as from company to company.

The Placement of the Worker on a Specific Job. With the various jobs in the plant analyzed, those charged with the responsibility of placing the worker on a specific job may use to great advantage information obtained from the pre-placement medical examination and the vocational or aptitude tests. The material can be conveyed in personal consultation between the doctor and the placement officer, or by written information sent by the physician to the placement officer. If the number of handicapped persons being hired is small, personal consultation is prefer-

able. For large plants employing many handicapped persons, written instructions may be more practicable and time-saving, provided the staff of placement officers is well trained in these techniques.

The United States Civil Service Commission has published an *Operations Manual for Placement of the Physically Handicapped* (2nd Edition, July, 1943). The study was made by medically trained personnel endeavoring to standardize minimum physical requirements for approximately 2,000 different positions, in both government and private establishments. In this report it is possible to find information about suitable positions for workers with various types of physical handicaps and about the location of such workers in factories. The manual is based upon a thorough understanding of both the physical defects of potential workers and the requirements of specific jobs.

In order to illustrate how the placement officer may use the information from the plant physician and the job analysis, several cases will be discussed in relation to a simple chart, developed by the United States Civil Service Commission. This chart, shown in EXHIBIT II, demonstrates how the results of job analyses may be tabulated. The first column carrying the heading "Occupations" may list specific jobs in the plant which have been analyzed as suitable for physically handicapped workers. Following the name of each job, under the "Physical Demands" and "Working Conditions" code columns, red (or black) blocks are entered indicating that these are abilities and conditions required for the proper performance of that job. The placement officer may expand this form, adding more columns on the right for comments and notes.

It is obvious that certain departments and jobs will not lend themselves to the

use of physically handicapped persons, while in others it may be fairly easy to adjust physically defective employees to various kinds of work. If each job is coded, the various factors relating to placement can be greatly expedited. The coding should be done by consultation between the safety engineer, the placement officer, and, if possible, the plant physician. With the physician's report in mind, the placement officer refers to the physical requirements of the occupation as illustrated on the chart. For example, he may wish to find a job in

proper place for the man when, after consultation with the physician, the exact degree of limitation is determined.

Great care should be taken in introducing handicapped workers into the factory setting. For example, it is not wise to present a noticeably handicapped applicant to a production executive or supervisor without first describing the ability of the person and the existing defect. Unless the ability of the person has been stressed in advance, the natural reaction of the supervisor is to see only the handicap or disability. After the

EXHIBIT II. PHYSICAL REQUIREMENTS OF OCCUPATIONS

OCCUPATIONS	PHYSICAL DEMANDS																											WORKING CONDITIONS									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	25	26	27	28	29	30	31	32	33	34	35								
	Walking	Standing	Sitting	Climbing	Crawling	Stooping	Kneeling	Lifting	Pulling	Pushing	Using 1 foot	Using 2 feet	Using 1 hand	Using 2 hands	Seeing	Talking	Hearing	Outside	Inside	Hot	Cold	Humid	Wet	Dry	Dusty	Fumes	Noisy	Oily									
TURNING DEPT.																																					
JOB # 1																																					
JOB # 2																																					
JOB # 3																																					
JOB # 4																																					
JOB # 5																																					

the plant which does not require lifting or working in a hot environment for a patient with a minor cardiac defect. The placement officer, in checking across the vertical columns opposite job #1 finds that 8 (lifting) and 27 (hot) are among the requirements for this job. He immediately knows that this particular individual cannot be assigned to job #1. He thus checks through the requirements of other jobs listed until he finds, for instance, job #3 which does not require lifting or hot work. If there is more than one job of this kind, he selects the job which appears most suitable to the person concerned. If there is no job found suitable for this man, the placement officer may still find a

applicant has started to work, supervision is also often necessary, to guard against overzealous effort. In addition, the handicapped worker dislikes attention and should be allowed to make certain adjustments himself without depending on others. Sympathetic fellow workers can often take responsibility for assisting the handicapped persons in case of fire or other emergencies, and for aiding with minor remedial conveniences (for instance, providing a swivel chair to make it easier for a worker with heavy braces to rise and to sit down).

Procedures for Following the Handicapped Worker in the Plant. The ultimate success

of any program for the physically handicapped depends upon following such cases after they have been examined and placed at work. It is advisable to have an accurate record for the use of the medical and safety departments which provides for the following: (1) a record of events due to illness or accidents; (2) periodic progress notes on production and acclimation as obtained from personal interviews with the foreman; (3) follow-up on periodic examinations which may have been indicated by the doctor; and (4) a record of corrective action taken, by cases listed as remedial by the physician. The follow-up should include a 30-day check-up on the effectiveness of the worker's placement by the safety department. After the worker has been satisfactorily adjusted, care should be taken to see that some supervisor or foreman does not transfer the worker to another part of the plant or to another job without examining his medical record or consulting the plant physician and the safety department; experience has indicated that most of the difficulties in the use of physically defective workers result from this source.

Precautions to Follow in the Employment of the Physically Handicapped

It would be absurd to think that the problems for management in the employment of the physically handicapped can all be easily solved. Indeed, if special abilities are not revealed, if the handicapped workers show no sign of higher-than-normal productivity, through unusual talents or the exertion of greater effort, it would be best to employ persons with more normal reactions and physique. Although it is not possible to outline all the difficulties here, attention can be called to some of the less obvious:

(1) Certain plants which have failed to make job surveys and use medical placement officers in cooperation with safety departments in the employment of the physically handicapped have had increased accidents and health problems, and lost time has tended to be serious. The increase in lost time and in industrial compensation has been an added financial burden for management. This will be discussed in detail below. (2) Another problem results from the fact that, although physically handicapped workers often do one thing very well, on jobs requiring diversity of movement an increased number of such workers has been needed. Consequently labor and other costs have risen in some departments. These increased costs, now borne by the government, may not be allowed with reduced business activity. This may tend to place the physically handicapped worker at a disadvantage. (3) Unless such men are carefully placed, they may be subject to various hazards. Certain handicapped employees may stand too long or injure themselves unwittingly. The impairment may not show up until later. Thus after some are laid off, they may claim compensation and create a continuing problem of claims for years to come. (4) Also, such workers may tend to put extra responsibility on their fellow workers. The fact remains, however, that many physically handicapped workers have been successfully employed in industry, and this is likely to continue for some time as a result of the returning veterans and the desire of industry to use them.

Let us take one aspect of the problem which has escaped the attention of management in a number of large concerns—that is, the recent marked increase in the number of serious cases which have received industrial compensation. The

loss rate on industrial compensation in certain casualty insurance companies which have paid little attention to the problem has doubled since the war. The large number of women in industry has contributed to this increase, but the physically handicapped have played an important role.

The purpose of industrial compensation is to make sure that the worker receives prompt and adequate medical attention at the time of an accident and that fair compensation is paid for each injury received which is related to his industrial employment. Procedures must be set up for handling cases to make certain that all the facts relating to the accident are ascertained at once, especially if large numbers of physically handicapped workers are employed. It is obvious that compensation should not be paid for injuries which are not related to the employment of the worker, or for illness not associated with the worker's employment. If rigid control is not maintained, it is possible that some workers may take an unfair advantage of management and press claims unreasonably based upon an aggravation of pre-existing defects. If there is a great increase in such cases, the casualty insurance companies, which bear the original costs, will pass this expense on to management; the results will be higher insurance rates and possibly lower wages for the workers, with less protection in accident and sickness benefits. Thus, it is the responsibility of both management and the workers to see that no unfair practices result from taking on large numbers of physically handicapped individuals.

It is well known that the large numbers of able-bodied men who left industry to enter the armed forces were replaced by individuals with physical defects in many factories and business

concerns throughout the country. This situation tended to strengthen the safety departments in many factories, and great care has been exercised, resulting in an actual lowering of accidents in many concerns. Nonetheless, there has been a striking increase in the number of serious cases of industrial compensation, obtaining partial or full benefits without actual loss of working time. In many companies these cases have increased from 200% to 500% in the first part of 1944 compared with the similar period in 1943. This increase may be ascribed to many different factors, but in particular it indicates a loss of control in both the medical and compensation departments, as well as a tendency on the part of labor to press claims for compensation which have not always been justified. If one employee obtains such benefits, it is only natural that others may follow, giving rise to widespread attempts on the part of many workers to obtain compensation benefits. Experience has demonstrated that the following precautions are of great importance:

- (1) The employee who appears at a first aid station or hospital should be required to present a written statement from the foreman or supervisor concerning the injury or illness and how the accident took place. This statement will certify the plausibility of the accident and indicate whether the worker could have been lifting certain objects, for example, or could have been subjected to certain strains or stresses.

- (2) The nurse or physician should always give first aid. The physician should make a diagnosis and recommend treatment and also state his opinion of the causal relationship between the injury or illness and the industrial setting. This diagnosis should be made by the plant physician free from outside influences of either management or la-

bor. It should be a working diagnosis, providing a basis for proper treatment. If the case is not compensable, the patient should be sent home to the family physician; thus, a definite statement should be made about the disposition of the case. Overtreatment in the factory for nonindustrial injuries or illness may later form the basis for compensation even though it is not justified.

(3) A report of the accident and of the treatment given should be accurately stated in the medical folder of the employee, which already contains a detailed statement of the patient's previous physical defects.

(4) Those concerned with placement and safety should investigate to find out whether the instructions of the pre-placement examination may have been violated. If a transfer is necessary, both the medical and placement officers should be notified so that men will not be placed on jobs which are contraindicated.

(5) Great care should be taken to see that accidents are reported immediately, even though many state compensation commissions allow for late reporting; and that those concerned with safety see the accident record and have an opportunity to correct the condition which gave rise to the accident. Workers should be instructed to report accidents at once.

(6) Because the abler physicians in many concerns have gone into the service, attempts should be made to maintain high standards of professional competence and medical control through proper indoctrination of the new medical officers by physicians experienced in industrial medicine. The use of specialists and part-time physicians or recourse to any other procedure for upgrading is recommended.

(7) It is reasonable that the labor

unions should be interested in the protection of their men. However, in the event that workers are coached unfairly by the unions or by private lawyers to press claims in unjustified cases of compensation, then controls should be carried out with greater care than ever before. With so many physically handicapped workers in industry, it is certain that the number of claims will increase very strikingly unless rigid control is maintained.

A number of illustrations of poor practice along these lines may clarify some of the above generalizations:

In one factory engaged in war work, the men were allowed to appear at the first aid station without a report from the foreman as to how the accident occurred. The complaints were recorded by the receptionist, untrained in nursing or medical matters. Closer investigation revealed that many of the claims were unjustified, for they referred to vague strains, aches, falls, and injuries not related to the work, and in some cases to injuries received outside the plants. The experienced plant physicians were in the services, and those on duty were untrained in industrial compensation and incompetent to do industrial surgery. Furthermore, the unions had coached the workers on how to obtain industrial compensation. In fact, there were lawyers working in the plants who coached the workers and then pressed their claims legally. In one case a worker was receiving compensation for an injured back which was obtained in a fight outside the factory.

In another case the medical record stated that a foreign body had been extracted from an eye. Upon close diagnosis the eye proved to be tubercular, a condition that must have existed previous to employment. Later the state commission, because of the treatment

indicated in the medical record, awarded total disability for the loss of the eye. In another case a heart patient died a few days after being employed, and the family was given total compensation; this condition must have existed previously, and full compensation was not justified.

Sometimes management may be at fault. In the case of another cardiac patient, the pre-placement examination indicated that the employee should not work under hot conditions or lift heavy

weights. The follow-up was poor, and the man became very ill while carrying heavy objects. This responsibility should have been placed on the management because of poor control and supervision of its handicapped workers.

Thus, it is obvious that unless the handicapped workers are carefully supervised and controlled, the increased costs of industrial compensation, as a result of the large numbers of physically handicapped now employed in industry, may take on proportions of alarming size.

II. REHABILITATION OF VETERANS

In the foregoing discussion an attempt has been made to outline some of the results which have been obtained with physically handicapped workers in war production. It is now in order to try to analyze what will happen when the veterans return to their former jobs with handicaps which may be even greater than the handicaps of those enlisted from the civilian population for war industry.

Incidence of the Physically and Mentally Defective Veterans. It is estimated that the armed forces will be made up of some 10,500,000 men when the fighting ceases. A large number of service men have already been discharged. In the spring of 1944, discharges were running approximately 50,000 per month. From December 1, 1941, to June 30, 1944, the separations from the Army were 1,200,000 enlisted men, 47,000 officers; total, 1,247,000. Of this number, 460,000, about 37%, were discharged with certificates of disability. It is estimated that after the collapse of Germany upwards of 2,000,000 men may be marked for return to civil life. Although, of course, not all veterans will be physically handicapped, it is estimated that

500,000 men with leg, arm, or hand missing, one or both eyes gone, deafened, nervously ill, or otherwise incapacitated will need vocational rehabilitation.

Blood plasma, sulfa drugs, improved surgery, better military hospitals, and speedier removal of the wounded from the battle areas are keeping alive, out of each 100 wounded, from 13 to 15 men who would have died if the conditions were the same as in 1918. Today out of every 100 wounded in combat, only 3 actually die. The Army estimates that 15 out of every 100 men who go into battle will be wounded, while one estimate places Navy casualties at one-tenth of the men in action. Although it is impossible to forecast the exact number of casualties, there is no question but that the figures will be very large.

Probably the most difficult problem in the employment of disabled veterans pertains to those who have been or will be discharged with mental and emotional disorders. From July, 1941, through January, 1943, more than 100,000 men were discharged from the armed services for mental disorders. In fact, about one-fourth of all discharges from the services are for nervous and mental disorders. While the incidence

of discharges for mental disorders is probably due in part to the fact that neuropsychiatric examinations at the time of original selection were necessarily short, the principal cause is the stress to which all civilians are subject when required to adapt to military life and to combat conditions. The headquarters for Selective Service predicted that at the end of 1943 the rate for discharges of this kind would be approximately 6,000 to 8,000 a week, or 300,000 to 400,000 a year. There are 31,000 veterans from the last war still hospitalized with mental disorders. It is estimated that at least 80,000 veterans from this war may linger in hospitals with troubled minds, and large numbers will be discharged who are less seriously ill. Of these, a majority will recover completely. Many of the others will be able to get along fairly well in their home communities and will not be too ill or too abnormal to work steadily. In fact, many of them tend to be very conscientious and on returning to their jobs will do excellent work in industry. One war plant now has over 1,500 employees, out of 60,000, with medical histories of neuropsychiatric disorders.

Legal Responsibility for Re-employment

The Re-employment Division of the Selective Service System is charged by law with the responsibility for assisting all honorably discharged members of the armed forces, both men and women, either to regain their old jobs or to obtain new jobs. The Re-employment Division consists of a National Headquarters under a chief responsible to the Director of Selective Service. Its functions are planning, administration, inspection, and interpretation of the law. The re-employment committeemen attached to each local draft board constitute its direct operating agency. There

are at present 15,000 such committeemen, and the number will be increased as needed. They are the friends and agents of the veteran; they act directly to reinstate him with a former employer and are his agents and follow-up men in securing for him the special services of other government agencies such as the Veterans Employment Service.

The private employer is obligated to reinstate all such honorably discharged veterans as are capable of performing the duties of their job and who apply within 40 days of discharge. The law states that a veteran must be reinstated in his old job or one "of like seniority, status, and pay" if the position he left was "other than temporary," if the veteran is "still qualified to perform the duties of such position," and "unless the employer's circumstances have so changed as to make it impossible or unreasonable to do so." Presumably, nonveterans must be released, if necessary, to make places for returning service men or women. Once reinstated, a veteran is to be considered to have been on leave of absence from the company and is to resume his status as to seniority, pension plans, and similar benefits. He may not be discharged without cause within one year. The language of the law is broad and general and is being construed on the basis of its spirit and intent and not on narrow legal interpretation. It is being administered industrially and not by legal rulings and therefore conforms to the practices of employment. Thus far, both employers and organized labor have cooperated fully in the administration of the act.

The War Labor Board has ruled on a few union contracts as they affect the seniority rights of returned veterans, but much clarification is still needed. The assumption is that the first man drafted out of a job is the one who gets taken

back permanently, no matter how many others held it for a while before going into the service themselves. No dogmatic answer, however, can be given to the questions of what constitutes a permanent employee or what are the relative rights of people who have been hired during the years of war expansion. General principles have been evolved, but many cases must ultimately be settled on the basis of the particular circumstances.

Moreover, the law places no compulsion on employers to re-employ veterans incapacitated for their old jobs. Nevertheless employers have a duty to reinstate such veterans in the highest skilled job for which they have been fitted through vocational rehabilitation—and with the pay appropriate to that job. It is the Federal Government's responsibility, through its Veterans Administration, to make good the impairment of earning power by pensions scaled according to the degree of disability.

It remains to be seen how the law will work out in actual practice. There is no doubt that serious difficulties will arise in certain industries. In industries like aircraft manufacturing there has been a tremendous growth during the war period which will naturally contract when peace comes. One aircraft manufacturing company which had 3,000 employees before the war now has 30,000 stars in its service flag. And it is estimated that for every worker in the aircraft industry at the present time there is a man in the armed service who has left some aircraft factory for military service and who is entitled to re-employment. Because there has been a successive turnover of men being employed in this industry and then being called to duty, the question will arise as to what constitutes a permanent employee. Thus, in this industry alone many problems will arise, and discouragement will

naturally result if other industries are not able to absorb the surplus of aircraft workers which will no doubt exist.

The Responsibility of the Services

It is only natural that American industry is vitally concerned with the program of rehabilitation which will be carried out by the Army and Navy. If men who have been wounded in battle are taught how to handle themselves and carry on in some vocation, the factories will be relieved of a great responsibility. According to reports, the military services are giving a good deal of thought to the subject of rehabilitation, but a complete statement of policies, aims, and actions is yet to be made public.

Army Discharge Program. The Army has set up a program with simplified procedures for discharge, which now requires 48 hours as against 3 weeks previously. This program is now in operation at Fort Dix, but it is designed only for those men who are being discharged for other than medical reasons. The physically disabled are still handled through hospitals.

The Army discharge program works as follows: (1) Between the time a man is finished with active service and the time he is discharged, he is given the opportunity of discussing his problems with a vocational counselor able to inform him on the social and economic changes in American life since he went into the service and to help him to determine what his Army training and service have fitted him for—in other words, what steps are needed in the transformation, let us say, of a tank gunner to an automobile welder. (2) With the help of this trained personnel man (an Army officer), he fills out a separation qualification record. The service man takes this record with him.

It contains information on his preservice education, civilian occupation, qualifications, a record of military service and education, preference for additional training or schooling, job preference, and locality preference. Other centers on the Fort Dix model will be established throughout the country as conditions warrant.

Army Rehabilitation Program. Although this program for discharging the veteran, with accurate records of his training and military experience, will be of great value, it does not deal with the problem of teaching the physically maimed veteran to handle himself and to prepare to take on a job in industry. To teach many of the wounded to do this will require months or even years of occupational and physical therapy.

Rehabilitation in the Army falls into two major categories: (1) the reconditioning of the soldier, convalescent from disease or injury, who is to return to duty, and (2) rehabilitation (medical, social, and vocational) of the soldier who is unfit for further service.⁵

Early in the war the Royal Air Forces in Britain found they were losing battle-seasoned men of proved courage by reason of lingering disabilities. Manpower shortages compelled interest in the convalescent patient, and planned training of convalescents was highly successful. The United States Army in the European theater has established convalescent centers likewise. The Army Air Forces have worked out a Convalescent Training Program for all air station hospitals. Army Service Force station and general hospitals have also been instructed to organize convalescent training programs, and most of them now have reconditioning units in operation.

When a soldier is sick or wounded, a rehabilitation program is started as soon as the physical condition permits. Here are three examples of the way in which such a program will be constructed for men with different disabilities:

(1) Blind service men constitute a group requiring special rehabilitative measures. They are retained in two hospitals designated as rehabilitation centers for that purpose until each individual soldier has adjusted himself to the handicap of blindness sufficiently well to be able to care for himself and to get about easily and until he has learned certain basic substitute skills designed to minimize his handicap. He is retained in the military service until he is capable of undertaking vocational training provided under the Veterans Administration plan, or until he is able to provide for himself at home, should he not desire or need additional job training.

(2) The deaf remain in three hospitals designated as rehabilitation centers for those with impaired hearing until tests are made and hearing aids fitted to those who will benefit from them. Teachers instruct the men in the art of lip reading, and in six to eight weeks almost all become adequate lip readers. Speech correction teachers are on hand to prevent deterioration of speech.

(3) The soldier who suffers an amputation goes to one of five designated hospitals. Amputees are hospitalized and retained in service until they have been fitted with a temporary artificial limb, if this is possible, and have learned how to use it properly. Six months after discharge a permanent artificial limb of the latest design may be secured from the Veterans Administration.

The Army Air Forces have set up reclassification centers at Atlantic City

⁵ F. W. Rankin and W. E. Barton, "Present Status of Rehabilitation in the United States Army,"

Journal of the American Medical Association, Vol. 25, No. 4 (May 27, 1944), p. 256.

and other places in the United States. After service in combat zones, the airmen and ground crews return here to be studied from the point of view of assignment to new duties or discharge from the service. Many of the men who are being discharged, however, apparently should have further rehabilitation before becoming capable of taking a job in industry; this is especially true of those who are suffering from the mental or emotional disturbances associated with the extreme conditions of modern aerial warfare. It would appear, therefore, that society and industry will be charged with a great responsibility in the case of many of these younger men who are being released.

Navy Rehabilitation Program. In May, 1944, the Navy announced the establishment of the Office of Rehabilitation of the Bureau of Medicine and Surgery under the direction of the Surgeon General, Vice Admiral Ross T. McIntire. The Navy has chosen the word "rehabilitation" as descriptive of its efforts, in that the Navy will attempt to restore the veteran to his former state in so far as it is possible to do so. This implies a conscientious planning and execution of those procedures which the practice of good medicine offers as restorative measures to a person suffering from any given disability so great as to inhibit him from taking part in the activities of a normal man, be they military or civilian. Rehabilitation will be interpreted as meaning all activities and services which may be required to supplement the usual therapeutic procedures in order to achieve maximum adjustment of the patient.

The Navy program classifies the men to be rehabilitated into (1) those who, because of anticipated complete physical and mental repair, will be returned to

duty and (2) those for whom complete physical and mental repair is not likely or possible and who, because of that fact, will be discharged from the service. Thus, the Navy rehabilitation program takes a broad view; it envisions its charges, after they are taken over by the Veterans Administration, as being placed back in civilian life in the best possible physical condition, more or less self-sustaining members of families, happy citizens in communities proud to have them back, and realizing that their efforts in service have not been unappreciated by the Navy. If such a program is actually carried out, it should result in returning to industry men who can take care of themselves, and industry will need to concern itself only with the problem of placement, training, and assimilation of the veterans.

Firsthand Observations in Combat Zones

Since the beginning of the present war, the writer has had an opportunity to visit three of the combat zones—namely, Africa, Alaska, and the Southwest Pacific. His duties have brought him into personal contact with large numbers of men under varying conditions of climatic extremes and stresses of battle, especially as they relate to the ground forces and air crews of both military and domestic aviation. In this way he has been able to obtain certain impressions which are directly related to the problem under discussion here.

Any visitor to the combat zones cannot fail to be impressed by the fact that our military leaders have planned the operations of the present war so as to prevent as many casualties as possible, and that unusual medical facilities, well known to everyone through the daily press, have been provided for all branches of the armed services. It should be remembered, however, that all war-

fare implies the expenditure of human beings, whether they be actually killed, wounded in action, or placed under conditions of great stress which bring about psychic changes. The conditions of stress in this war are greater than ever before, with fighting in all parts of the world; in submarines, in tanks, in aircraft, and on the ground; under all conditions of terrain and climatic extremes. Many illustrations could be given to make these generalizations more vivid, but the few which space permits may help to bring out a number of points essential to this discussion.

Ground Aviation Units in the Southwest Pacific. The most recent study in which the writer participated was concerned with the rotation of services and rest periods of the ground aviation units, made up largely of enlisted men, in an active combat zone in the Southwest Pacific. Some of these men were on active duty in the Pacific at the time of Pearl Harbor; others were sent to that region immediately thereafter. Because of the great distance to the United States and to the parts of Australia and New Zealand with more temperate climates and because of the shortage of shipping facilities, many of these men have been in the same tropical areas without rest or rotation of duties since arriving in that theater of war. For long periods of time they have worked seven days a week on the maintenance of aircraft, often under enemy bombardment. They have been under the emotional stress of following their planes and flying comrades without experiencing the drama and excitement of aerial warfare. While under attack, controls could not be set up for tropical diseases; consequently, many have experienced repeated attacks of malaria, dengue, dysentery, and other illnesses. With the increase in physical

stresses and with little hope of getting home, their morale has been lowered. Many have become embittered, with the attitude men acquire when they feel that they have been forgotten. In certain areas, such as New Guinea, the Solomons, India, and China, the loss in man-days from sickness has been far greater than that due to enemy action.

Many of these men will present unusual problems of rehabilitation and readjustment. It is almost certain that they will not be understood upon their return, for the problems involved will be known only to those comrades, physicians, and officers who have gone through similar experiences with them. Anything that can be done to capture their interests and absorb their attention will be an effective way of assimilating them back into their work and home conditions. To have medical officers who have been with them placed in various industries—physicians who could use their intimate knowledge of the point of view and special problems of these veterans—would be especially helpful.

In the writer's experience, the outstanding feeling upon returning home from a combat zone is a sense of loss of contact with even one's most intimate friends. The experiences and surroundings of combat are so different from those at home that it is almost impossible to converse on a common level. The people at home seem to have no conception of the realities of the war; what ideas they do have seem to come from the daily press, misconstrued or misinterpreted. There is not only a complete letdown, with the absence of the dramatic experiences of the combat areas, but also a feeling of resentment that more is not being done to further the war effort—a feeling that is often not justified. If such emotions can exist so strongly in one who has experienced

only a few months in combat zones, under favorable conditions, think what it will be like for those who have spent many months or years in the hazardous experiences of modern warfare.

Men in the Flying Units of the Air Forces. Another interesting illustration may be found in the large numbers of young men who belong to the flying units of the air forces. These young men have been selected for aviation on the basis not only of physical fitness but also of intelligence and all-round ability. They comprise a large portion of our most able and youthful population. After a certain amount of intense training, they have been placed in fighter and bomber aircraft and sent to various parts of the world. In a new environment of the air they encounter the effects of high altitude, extremely low temperatures, centrifugal acceleration, and all the other stresses of modern aerial warfare. Many of these young men were among the college groups which just previous to the war staged strikes against fighting. Yet at the present time they are carrying the brunt of the war under conditions of combat that older men could not and probably would not endure. They have shown unusual skill and courage; they have accomplished feats of which this country may be justly proud.

But what has been their reaction to this experience? While the excitement and drama of modern aerial warfare have been carrying them along in day-to-day experiences, what has happened to their minds and emotions? What is the philosophy which motivates them? The writer, after flying and talking with pilots for many hours in various parts of the world, still finds it almost impossible to verbalize any answer to the question of why they are motivated to go over the target day after day. Cer-

tainly, the motives they are supposed to have, generalized concepts like democracy, are far removed from the actual experiences that occupy them so vividly now. Although the exact forms and nature of their reactions are difficult to anticipate, it is perfectly clear that they will be very different people when they return to their homes and to their future careers. Probably they can best be understood, each in terms of the individuality of his personal experiences, temperament, and mental reaction. Their adjustment will require the most careful assistance of the best that the country has to offer in medicine, education, and industry.

Jungle Fighting. Finally, let us take an illustration from the jungle fighting of the land forces in the Southwest Pacific area. Consider the effect on the average young Marine who has been brought up in a normal peaceful environment and who has been suddenly thrust into jungle warfare—thrown back on the most primitive reactions, such as many previous generations of his forebears have not had to face. These men have witnessed extreme cruelty in the form of mutilation and torture of their own comrades at the hands of a cruel enemy. We can definitely say that they have not resorted to primitive treatment of the enemy whom they capture, but it is well known that they have killed the enemy indiscriminately, without apparent feeling and indeed much to the disappointment of their commanding officers who were anxious to obtain more captives for questioning and study.

Will their attitudes toward death and killing carry over to social situations at home? Will their original jobs in industry interest them enough so that they obtain a satisfactory adjustment? Possibly those who have suffered intense

emotional experiences without physical injury may be more difficult to adjust than those who have lost an arm, a leg, or an eye. Here again, it will require subtle psychological understanding to assist such men to make a successful adjustment to industrial situations.

Characteristics of Returning Veterans

Although it is impossible to work out sharp lines of demarkation for the physical and mental conditions of the returning veterans, the following classification may prove to be useful for this discussion:

(1) In the first place, the so-called *normal* veterans will present many problems which will need special consideration. It should be remembered that many young men will have gone through very formative periods of their lives under conditions quite foreign to their own home environment. Most will have experienced some degree of stress or a change in their daily habits of living, and they will be very different men from what they were when they joined the services. Conversely, their home environment may be different; their most intimate associates will also have changed during the years they have been absent.

(2) There will be a large group of men with *emotional and mental disabilities* of a neurotic or psychotic nature. In many respects these men may be the most difficult to assimilate into their previous industrial jobs. Special care must be taken to see that such individuals do not work alone, that they are not placed in noisy, congested areas or under stresses which might make them more irritable and nervous. Many of them will make satisfactory recoveries with the aid of skilled psychiatric advice.

(3) There will be many men with *general physical deterioration* of a nonspecific nature due to prolonged service at the front or in tropical and isolated

regions. Many will have spent long periods under conditions which have given rise to excessive loss of weight and general physical deterioration not associated with organic diseases. Others will have experienced repeated attacks of tropical diseases, such as malaria, dysentery, dengue, and fungus infections, or, in the Far North, shock and other disabilities from the extreme cold. They should be allowed sufficient time to recover their strength for routine work.

(4) A large group will have suffered the loss of a hand, an arm, or an eye, or will be in some other way *physically maimed and incapacitated*. Extensive burns and other defects from explosives or from modern combat conditions in aircraft and tanks will require months or even years of treatment for the grafting of skin and other surgical procedures to restore them to a condition where they can live a more or less normal life. The initial attempts at rehabilitation in such cases should be made by the services and hospitals for rehabilitation. It is hoped that those with physical handicaps will be taught how to carry out the daily functions of living which involve many manual or motor activities; such activities are usually performed unconsciously but require prolonged periods of time if they have to be relearned or if new reactions are substituted for them. Industry must continue to aid in building up the confidence of these men by placing them on jobs in which they can do effective work.

Problems of the Normal Veteran. The psychological changes which will have taken place in the normal veteran may pose questions which are far greater than at present realized. The problems of readjusting them to the normal routine of home life and industry will be very great. They will be, of course,

extremely anxious to get home and see their loved ones. But after the homecoming is over, they may be very restless and full of indecision. Some will feel that they have paid dearly and will expect to be compensated—not merely in money but in many other ways. Many will feel that the people at home have been making more money than they have. For one reason and another, they will have a feeling of resentment. Some of the most difficult to adjust will be the clerks who have become colonels and the messenger boys who have become majors; for these men, standards of living have gone up and they will expect scales of pay far greater than they earned before the war.

These normal veterans have been fed and clothed; they have gone through two or three years with no serious financial difficulties, with a philosophy of living from day to day, with no sense of responsibility for anyone else. The excitement and drama of modern war will have carried them along, and the letdown will be drastic. There is no doubt that the veteran will find it hard to settle down to work, to the routine tasks of daily life.

It should be kept in mind that even though the veteran has not been greatly changed by his war experience, the company to which he returns may be vastly different, and thus his old position will not be the same. Most industrial enterprises have shown striking changes during the period of war activity. Not only have manufacturing procedures been altered, but many whole companies have undergone a complete transformation. Quite a few companies have attempted to keep in close touch with employees in the services, following their experiences, and informing them of new company developments.

The United Air Lines, for example,

has already started on a re-employment program. Periodic contacts have been made with in-the-service employees numbering approximately 1,800. The company plans for the rehabilitation of the physically handicapped; indoctrination on important changes within the industry, and specific training consisting of refresher courses in various company activities; familiarization with new company policies and postwar plans; and specialized training to augment technical training and other education acquired while in the Army or Navy. New opportunities will no doubt exist in an expanding company like United Air Lines; the company had 4,300 employees in 1941, has 8,000 at present, and expects to have an employee group of 18,000 within four years after the war.

The personnel director of United Air Lines has described the re-employment policies as follows: (1) Questionnaires are sent to every employee on military leave, asking for information on the military record, experience, and education acquired. Of these questionnaires, 75% have been returned, and 75% of the replies indicate the employees have had specialized training in the services; 12% indicate that they want a different job classification when they return. (2) As soon as a service man is demobilized, he will report to any United personnel office, stating his future plans and giving the approximate date on which he will be able to report for re-employment. (3) He will be entered on the payroll at the same salary he received before going into service. His personnel record will be reviewed; he will indicate his choice of job, will undergo complete physical examinations, will fill out various company personnel records; and after discussion with the various department heads interested in his case, he will be assigned to his old or a new position.

(4) He then will take the prescribed refresher training for that job.

The Mentally Disturbed Veterans. It is anticipated that many of the returning veterans will be suffering from some form of neuropsychiatric disability. It is estimated that one-fourth of those now being released from the service are so affected. Many of these cases were not detected at the time of their induction into the services because of the vagueness of their symptoms; it was the routine of military life or initial experiences in combat zones that brought out the nervous and emotional weaknesses. Possibly a large percentage of the men will have some alteration in their mental attitude toward civilian life. The large number of men in this group indicates the impossibility of evading the problem on the part of business and industry; industrial concerns must be prepared to handle the problem with accuracy and dispatch.

One reads in the newspapers of various cases described as neurotic or of men suffering from operational fatigue. In the last war the term "shell shock" was more commonly used. It usually refers to the person who is unable to carry on with his normal duties because of disabling anxiety, feelings of insecurity, fatigue, or persistent and disturbing thoughts which the individual cannot dispel even though he recognizes them to be foolish.

Medically, there are three large groups of mental aberrations: (1) Psychoneurosis, which is not insanity but a maladaptation of mental and emotional factors, prevents one from carrying on the business of normal living. Many persons who might be termed neurotic have made good social adjustments and work in industry. Most neurotics tend, however, to be unstable

and unusual in their behavior. It is estimated that about 60% of all patients going to doctors in peacetime are psychoneurotic; they go from one physician to another, complaining of various aches and pains for which the physician does not find an organic cause. In industry, these are the workers who tend to become involved in accidents, make excessive claims for compensation, and ask for special privileges. (2) Psychosis, commonly referred to as insanity, is a more severe mental disorder in which there is a complete disintegration of normal personality involving flights from reality and loss of insight into social and individual situations. The above two groups constitute at least 75% of all mental diseases in the armed forces. It is estimated that at least three-fourths of these, if handled properly, will make a satisfactory readjustment to civilian life. (3) A smaller percentage of the individuals classified as mental cases are those with structural brain damage, including brain injury from gunshot wounds, sleeping sickness, syphilis, epilepsy, and mental deficiency. Only a small percentage of this group will be employable in industry.

Many of the veterans who have been suffering from minor nervous disorders will be employable in industry and will show improvement upon returning to their previous positions in business or the factory. It is obvious why such individuals with heightened emotional reactions, nervous indigestion, chronic headaches, marked variations in blood pressure, dizziness, and other neurotic complaints have not been able to adjust to the experiences of military life. There are already many such individuals in civilian life, and they are apt to do well in more routine situations, provided the environment is satisfactory. If a veteran with minor nervous disorders is kept

from reliving his battle experiences and can become physically tired from routine work so that he tends to sleep well at night, he may soon become adjusted. Attempts should be made to see that he does not drink immoderately and to keep him free from sudden, excessive noises and intense emotional situations, especially jobs carried on under pressure.

If these men are to be successfully assimilated in industry, more attention will have to be given to problems of human understanding and adjustment. The greatest contribution management can make in handling personnel under our present competitive system is the creation of a personalized relationship between labor and management. This statement is equally as applicable to government service as to private business. From the psychological point of view, the total lack of interest in the social, economic, and personal problems of the employee encourages a feeling of subconscious antagonism on his part toward his employer and discourages a personal interest in, and the natural ambition to improve the quality and quantity of, his work. The traditional ultimatum of the personnel supervisor to his employees, "If you don't like working conditions here, you are free to quit any time," is not only outmoded but is downright bad psychology and therefore uneconomical.

In the rehabilitation of such persons, the chief aim is to make the individual as well as or better than he was prior to his induction. This implies that he must be made self-sufficient, self-supporting, and able to cope with his environment, although he may still carry with him the nucleus of his psychoneurotic difficulty. This rehabilitation will involve the efforts of a number of individuals besides those who are skilled in the field of mental disorders: (1) the

internist; (2) the psychiatric social worker, for family reassurance and community activity; (3) the psychologist, who needs to do certain tests to determine intelligence and clarify the diagnosis; and (4) the placement officer to find jobs for him.

Some employers have treated as primary the employability of the person in terms of hours, work, wages, and completed projects. This attitude is unscientific, and work indices show that personality adjustment of the man on the job will be the true measurement of the results obtained. The reorientation of the service man will be more difficult if he has suffered mental disease or personality alteration. He will need every possible aid that society can give him to make this change. Work is the greatest emotional liberation man can have. People thwarted by emotional conflicts become worse by inactivity.

General Physical Deterioration. According to the present law relating to re-employment, the veterans are supposed to be reinstated within 40 days after being released from the services. It is probable that many of the men who have been in combat in tropical, arctic, and other climatic extremes will be unfit for strenuous jobs in industry so soon after their release from the services. Many will have suffered excessive loss of weight and general physical deterioration from the stress of combat or the tropics. Many others will have contracted chronic diseases, such as malaria, dysentery, sleeping sickness, and other serious illnesses from years of service overseas or from intense combat. It is well known that one is never really cured from a disease such as malaria. Those who have suffered repeated attacks will be of only limited use in industry until they have had long rest.

Although the military and public health officials will do everything possible to control the spread of contagious diseases to this country from the various parts of the world, this problem should not be overlooked on the part of industry. It is possible that service men will be returned to the United States from distant parts of the world within a relatively few hours or days, with the result that they may have contracted a contagious disease abroad which will not be manifest until they have reached this country. It is for this reason that the medical departments of all business and industrial concerns should give physical examinations and follow the medical histories of returned veterans with great care. Industrial physicians should be particularly on their guard against the possibility of making a wrong diagnosis because of unfamiliarity with the symptoms of tropical diseases and other illnesses contracted in distant lands.

The Physically Handicapped Veteran. Probably the most difficult problem relates to the rehabilitation of veterans who have experienced severe impairment through the loss of some extremity of the body, an eye, or severe burns and wounds in combat. Presumably these men will have to be taught in the military hospitals how to make certain adjustments of a simple nature. This training should enable them to carry out the functions of daily life, that is, to get about without the aid of others and to take care of themselves. Before they can return to active work in the factory, however, they will need additional training in specific jobs.

An interesting illustration of how rehabilitation can be started with veterans who are still recovering in a hospital comes from Brooklyn, New York. One of the local companies engaged in manu-

facturing highly critical equipment for the war has cooperated with the occupational therapy department in the naval hospitals in that region to the extent of putting the disabled veterans to work while they are still in bed or confined to quarters. The company has adapted the work to the disability of each sailor, and 300 men have already been absorbed into the company from the local hospitals. Not only do the veterans feel that they are doing something useful, but they are also receiving training which will be of practical value later.

Many concerns have been so successful in the employment of physically handicapped workers in war production that they are willing and anxious to hire handicapped veterans that are now coming out of the service. One of our largest national concerns has recently set up a special employment department to employ physically handicapped veterans. This company believes that it can place up to 15,000 veterans.

It should be kept in mind, however, that the greater proportion of returned veterans will not seek employment in our larger industries, but rather in the smaller establishments—that is, in the community bakery, laundry, garage, and so forth—that make up the great bulk of working establishments in our small cities, towns, and villages. These smaller establishments have had little experience with the problem of rehabilitation, and it will be necessary to educate them through literature, community programs, and local medical clinics.

The Responsibility of Industry. Industry's job is to produce and to distribute as economically as possible the goods which society wishes to enjoy, and thus to afford opportunities for work and for investment of savings. It is the responsibility of management, also, to offer em-

ployment as far as possible to a full cross section of the community, not merely to the ablest, and then to make that cross section produce efficiently. But industry's responsibility in rehabilitating disabled veterans is not identical with society's responsibility or with that of the services or the government; industry can rehabilitate only those who *desire* to work and are *able* to receive training. Obviously, some disabled veterans fall outside this area, and they must be cared for by the government or by society as a whole.

According to Robert W. Gaylord, President of the Ingersoll Milling Machine Company and a director of the National Association of Manufacturers:

Industry's part in the rehabilitation program offers an unexcelled opportunity for enlightened management to assume one of its much talked-of and little-defined social responsibilities. The job is important and it is new. Therefore, top management must take an active, personal part in order that it does not become a matter of routine before all of its potentialities have been explored. Just as a new technical process, an entirely new method of procurement, or a novel sales procedure deserves the sympathetic attention of top management to make certain that its novelties are understood and brought into line with company policies, so does the work of rehabilitating disabled veterans deserve the personal attention of those men who have the responsibility of seeing that industry does its part in meeting the general problems of society.

It is important from the point of view of industry to make sure that the handicapped veteran is allowed to feel neither that he is an object of charity because of his disability nor that he has a right to a livelihood at industry's expense. He must have a chance to earn his way and to know that he will not be discriminated against because of his disa-

bility. He should be encouraged and trained to become a productive and self-sustaining individual, in such a manner that his individuality develops, his earning power increases, and his own dignity grows because of the work he is doing.

Industry has had a great deal of experience in the past three or four years in training men and women to acquire new skills, by breaking down complex operations into simple ones that can be performed by less skilled men and women, in adapting shop work to women's skills, and in teaching employees of different races and colors to work together successfully. Rehabilitation of disabled veterans is only an enlargement of this field in which much has been learned—and much remains to be learned.

There will be some disabled veterans handicapped so severely that they cannot find a place to work within industry. There will be some who will not want to work but prefer to remain Federal pensioners. Those who fall into these two classes should be recognized and cared for accordingly. If society decides to pension them, society should carry the load. The purchasers of manufactured goods should not bear the expense.

Obviously the larger units in industry must carry the heaviest load of responsibility in any program to help the disabled veterans. The larger operations offer a greater diversity of jobs. Their personnel and medical departments and their training programs can more easily assimilate this new phase of old work. Smaller units should not neglect it, but the small manufacturers must depend on the larger ones to take the initiative, to do much of the exploring—in short, to lead the way.

The Responsibility of Labor Unions. The responsibilities of the services and of management have been discussed; it is

obvious that labor also has a definite role in the readjustment of the veterans in industry. In the first place, labor must cooperate with management to make the plans work effectively, by making concessions on such matters as seniority rights and employment practices. In the second place, labor might well aid by allowing veterans to start with the more desirable shifts and kinds of work.

Labor will be following a wise policy if it makes concessions to physically and mentally handicapped veterans—if only to help overcome the antagonistic feeling toward unions which many veterans will have developed. The veterans will come home, not having understood the wartime strikes in industries upon which they were dependent for supplies at the front, especially in the light of the higher wages and the greater safety and comfort at home. Undoubtedly there will be very serious tensions.

The Responsibility of Community Organizations. In addition to the contribution that industry and labor may make to the rehabilitation of the returning veteran, a great deal will remain to be done by community organizations. Already some attention is being given to this question by various state and local agencies. In Massachusetts, for example, the Governor has sponsored a state-wide program of local advisory committees to work with the state advisory committee of the Veterans Rehabilitation Plan; and Boston, like many other large cities, has a Community Information and Counseling Center. Representatives of federal and state agencies as well as private agencies will assist the veteran in his readjustment.

It would appear that communities can help in the successful adjustment of the returned veteran along these lines:

(1) Early location in jobs to prevent

the disintegrating effects of idleness and hopelessness.

(2) Medical diagnosis and prognosis, coupled with a vocational diagnosis as the basis for determining an appropriate plan for the individual.

(3) Vocational counseling to select suitable fields of work, by relating occupational capacities to job requirements and community occupational opportunities.

(4) Medical and surgical treatment to afford physical restoration and medical advice in the type of training to be given and in the work tolerance of the individual.

(5) Physical and occupational therapy and psychiatric treatment as a part of medical treatment where needed.

(6) Vocational training to furnish new skills where physical impairments incapacitate for normal occupations, or where skills become obsolete because of changing industrial needs.

(7) Placement in employment to afford the best use of abilities and skills in accordance with the individual's physical condition and temperament, with attention to safeguards against further injuries.

(8) Follow-up on performance in employment to facilitate further adjustments, to provide further medical care, and to supplement training if desired.

Conclusions

In this discussion of the employment of the physically handicapped workers and veterans, it is very apparent that a number of important steps should be taken at once. Although a great deal of knowledge has been obtained during the stress of war about the adjustment of handicapped workers, further study and research is indicated in the following areas: (1) method studies concerned with adjustment of tools and machines

to the handicapped worker; (2) physical medicine having to do with the restoration of the veterans' physical handicaps and limitations; (3) psychiatric studies and plans within factory communities; (4) medical programs and facilities in all industrial concerns, large or small.

Method Studies. In recent years a great deal has been accomplished by changing the construction or layout of factory manufacturing processes so as to use workers with physical handicaps. The shortage of labor forced many foremen to think of how procedures and machines could be altered to use a handicapped worker. Tools can often be rebuilt or redesigned for continuous operation without accentuating present defects or giving rise to loss of muscle tone, strains, aches, and pains which appear to be such common complaints at present. If our scientific and inventive talents could be directed toward this problem, the veteran with even marked defects could be used in a safe and efficient manner, and he would not feel he was being carried along by charitable agencies.

Physical Medicine. The advances which have been made in physical medicine in the present war are almost comparable to those made in the field of orthopedics in the last war. A number of the larger research foundations, medical schools, and research laboratories are turning their attention to this field with marked success. The report of the Baruch Committee on Physical Medicine in April, 1944, called attention to the following fields of investigation, useful in the rehabilitation of the veteran with marked physical defects: (1) the fundamental aspects of hydrotherapy and climatology; (2) structural mechanics of the human body; (3) electronics

as related to medicine, including the effects of extremely short radio waves on bodily structures; (4) physical devices employed in the diagnosis and treatment of disease; (5) physical apparatus such as that for the improvement of the circulation of the blood. Similar areas of basic research which require investigation are the influence of sound and ultrasonic waves, the requirements of physical movements of various occupations, the effects of heat and cold on the human body, methods of increasing the utility of artificial limbs, the effects of electrical stimulation and treatment of disease, and the psychological factors in physical medicine.

Psychiatric Studies. Just as industry has come to recognize the value of certain physical tests for all employees, such as the routine medical examination, the blood Wassermann, and the chest X-ray, it should now recognize the need for and value of a comprehensive inquiry into the employee's personality and aptitudes. Through the use of such methods, it will be possible to fit the veteran, or any new employee, into the most appropriate job at a minimum expenditure of time and money. Psychiatric studies are especially indicated for physically handicapped veterans.

It is therefore recommended that greater use be made of psychiatric fact-finding groups made up of psychiatrists or internists well trained in psychiatric medicine, psychologists or vocational advisors, and psychiatric social workers. The psychiatrist would study the subject's mental condition, the type of personality, and the effects of certain types of work; he would coordinate his own findings with those of the psychological test and assist in recommending the type of employment, carefully considering the relation of the physical handi-

caps to emotional disturbances. The psychologist would determine the veteran's vocational aptitudes; evaluate previous training, present abilities, interests—both expressed and hidden—through established techniques or tests; and also assist in vocational adjustments. The psychiatric social worker would obtain social, health, and occupational data which help the understanding of the nature and background of mental reactions; such a person would be alert to recognize remedial situations which may be necessary for normal performance on the job and would aid in keeping the workers contented on their jobs. These trained men would assist the plant personnel department to provide the proper type of occupation or job for the returning veteran, keeping in mind the employer's need—namely, to have workers who are physically and mentally sound and who have the proper aptitude and personality for the job.

Medical Programs. The problem of the returning veteran lays even greater stress

on the important role which a medical program can perform in industry.⁶ In the past, industrial medicine has not attracted the ablest physicians and surgeons into industrial medical departments because of the careless way in which such departments have been organized. In the readjustment period following the war many physicians who have had military experience can be persuaded to take full-time or part-time jobs in business or industrial concerns, provided compensation is adequate and the sponsorship of top management is assured. The medical officer who served in the war could be of great assistance to the adjustment of the veterans in the factory because of firsthand knowledge of their experiences and casualties; he could even supervise their adjustment to specific jobs and working conditions. It would appear, therefore, that all concerns, both large and small, should give greater attention to the establishment and maintenance of a medical department as an integral part of their organizations.

⁶ Cf. the author's article, "A Medical Program for Aviation," *HARVARD BUSINESS REVIEW*, Vol. XXII,

No. 1 (Autumn, 1943), p. 93, which discusses the role of medical departments in industry.



